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Palm Oil Industry Transformation in Indonesia: Repositioning Farmers from Objects to Subjects of Change

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Abstract

Indonesia's palm oil industry stands at a critical juncture, facing mounting pressures from global sustainability regulations, market demands, and climate change, even as it pursues ambitious production targets. This qualitative literature review examines transformation narratives in Indonesia's palm oil sector and critically analyzes the positioning of smallholder farmers—who manage 40% of the national plantations—within these processes. Drawing from 85+ sources published mainly between 2020 and 2026, including peer-reviewed journals, policy documents, and industry reports, this study reveals that dominant transformation narratives remain technocratic and compliance-driven, focusing on certification (RSPO, ISPO, EUDR), down streaming strategies, and productivity intensification. However, these narratives perpetuate the positioning of farmers as passive "objects of development" rather than active "subjects of transformation." The analysis identifies structural barriers rooted in Indonesia's dualistic agrarian system, including the HGU (land concession) framework, which systematically excludes smallholders from access to finance; asymmetric value chain governance; weak farmer organizations; and certification requirements that risk excluding rather than including. While partnership models such as nucleus-plasma schemes, inclusive closed-loop arrangements, and emerging cooperative initiatives demonstrate positive outcomes, they have not fundamentally altered power structures or farmer agency. This study proposes a paradigm shift toward a systemic transformation that positions cooperatives as owners of aggregate land and production, replacing extractive plantation systems with diversified tropical agriculture. Policy recommendations emphasize agrarian reform, innovations in financial inclusion, institutional strengthening, and multi-stakeholder governance mechanisms that authentically center farmer agency in Indonesia's palm oil transformation trajectory.

Keywords: Palm Oil Transformation; Smallholder Farmers; Farmer Agency; Sustainable Palm Oil; Cooperative Economics; Agrarian Reform; EUDR Compliance; Indonesia; Value Chain Governance; Institutional Empowerment

JEL Classification: Q13 (Agricultural Markets and Marketing; Cooperatives; Agribusiness), Q15 (Land Ownership and Tenure; Land Reform; Land Use), Q18 (Agricultural Policy; Food Policy), O13 (Agriculture; Natural Resources; Energy; Environment; Other Primary Products), O53 (Asia including Middle East)

Introduction

The Strategic Importance of Indonesia's Palm Oil Sector

Indonesia occupies an unparalleled position in the global palm oil economy, accounting for approximately 61% of the world's crude palm oil (CPO) production and managing over 17 million hectares of oil palm plantations as of 2024. The industry contributes 3.5% to national GDP, generates US$25.61 billion in foreign exchange annually, and provides livelihoods for 17.5 million people, including 2.3 million smallholder farming families. With ambitious targets of 60 million tons CPO production by 2045 and 100 million tons by 2050, palm oil remains central to Indonesia's economic development strategy, particularly through downstream processing initiatives and the biodiesel program that currently absorbs over 10 million tons of CPO domestically through B30 mandates [1-4].

However, this economic prominence exists alongside intensifying global scrutiny. The European Union Deforestation Regulation (EUDR), which previously became enforceable on December 30, 2025, imposes stringent traceability and deforestation-free requirements on palm oil imports. International sustainability standards, such as the Roundtable on Sustainable Palm Oil (RSPO) and Indonesia's mandatory Indonesian Sustainable Palm Oil (ISPO) certification system, require comprehensive environmental and social compliance. Climate change pressures compound these challenges, with increasingly erratic rainfall patterns, rising temperatures, and pest proliferation threatening productivity and farmers' resilience [5-7].

The Farmer Paradox: Centrality Without Agency

Within this complex landscape, smallholder farmers occupy a paradoxical position. Smallholders manage approximately 40% (6.8 million hectares) of Indonesia's oil palm plantations and contribute 34% of national CPO production. Projections suggest that by 2030, smallholders will control 60% of Indonesia's palm oil plantation area. This represents a remarkable transformation from 1980, when smallholders managed merely 6,000 hectares—just 2% of the national total. The nucleus-plasma partnership (PIR - Perkebunan Inti Rakyat) scheme facilitated this revolutionary expansion, integrating millions of farming families into commercial palm oil production [8-10].

Yet despite this quantitative centrality, smallholder farmers remain positioned as passive recipients of development interventions rather than active agents of transformation. In previous cases of Indonesia's palm oil transformation, farmers are treated as "objects of development" (objek pembinaan) rather than "subjects of transformation" (subjek transformasi). Current policy frameworks and industry narratives emphasize farmer compliance with external standards, productivity enhancement through extension services, and integration into corporate-controlled value chains. Rarely do they address fundamental questions of power, ownership, and control over value creation and capture [11-13].

This positioning manifests structurally through Indonesia's dualistic agrarian system. The HGU (Hak Guna Usaha) land concession framework, inherited from colonial-era plantation models, functions not merely as a land permit but also as a financial instrument that enables corporations to access substantial bank credit by using land as collateral. Smallholders, lacking HGU rights, remain excluded from formal financial systems, trapped in asymmetric market relationships, and unable to leverage assets for capital accumulation. Their productivity—averaging 2-3 tons of CPO per hectare annually, compared to 5-6 tons for corporate estates—reflects not just technical gaps but also structural disadvantages in accessing capital, technology, quality inputs, and extension services [14-16].

Research Questions and Objectives

This study critically examines the dynamics of transformation in Indonesia's palm oil industry through the lens of farmer agency and empowerment. The central research question is: How can Indonesia's palm oil industry transformation genuinely position smallholder farmers as active subjects rather than passive objects of change?

Specifically, this qualitative literature review addresses four interconnected questions:

i. What are the dominant transformation narratives in Indonesia's palm oil sector, and how do these narratives position smallholder farmers?

ii. What structural barriers prevent farmers from becoming genuine subjects of transformation?

iii. Which partnership models and institutional arrangements have demonstrated effectiveness in enhancing farmer agency and welfare?

iv. What policy reforms and systemic changes are necessary to enable farmer-centric transformation?

The study objectives are threefold. First, it synthesizes recent scholarship (2020-2026) on Indonesian palm oil transformation to identify patterns, contradictions, and gaps in current approaches. Second, it critically analyzes power dynamics, governance structures, and institutional arrangements that shape farmer positioning and agency. Third, it develops evidence-based policy recommendations that address root causes rather than symptoms, aiming to reorient transformation trajectories toward genuine farmer empowerment and sustainable livelihoods.

Significance and Contributions

This research makes three distinct contributions. Theoretically, it advances agrarian transformation scholarship by examining how global sustainability pressures intersect with domestic political economy to shape smallholder agency in commodity sectors. It challenges dominant technocratic narratives that reduce transformation to compliance and productivity enhancement, proposing instead a systemic framework that centers structural reform, power redistribution, and institutional innovation.

Empirically, it provides a comprehensive synthesis of recent evidence on Indonesia's palm oil transformation, documenting both promising practices and persistent challenges. By integrating academic literature, policy documents, industry reports, and civil society analyses, it offers a multidimensional perspective that captures complexity often obscured in single-source studies.

Practically, the study generates actionable policy recommendations grounded in evidence and theoretical rigor. These recommendations address agrarian reform, financial inclusion, institutional strengthening, certification facilitation, and

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governance mechanisms—offering pathways for governments, companies, civil society organizations, and farmer groups to pursue more equitable and sustainable transformation.

Conceptual and Theoretical Framework

Transformation Beyond Adaptation: Systemic Change vs. Technical Adjustment

Conventional approaches to transforming the palm oil industry emphasize adaptation—adjusting practices, adopting certifications, improving productivity, and complying with external standards. However, genuine transformation entails more than incremental adjustments within existing structures. Transformation must be understood as "changing the form of the economic system itself," not merely adapting to external pressures. The critical question is not "how can palm oil adapt?" but rather "transition toward what system and with whose economic logic?"

This distinction between adaptation and transformation aligns with broader scholarship on agricultural structural transformation. It has been demonstrated that oil palm cultivation in Indonesia has contributed to structural transformation by enabling labor-saving production systems that free household members for off-farm employment and entrepreneurship. However, such transformation has occurred primarily within—and has reinforced—a dualistic agrarian structure that privileges large-scale corporate estates while marginalizing independent smallholders [17-19].

True transformation requires interrogating and restructuring the fundamental relations of production, distribution, and power. It demands addressing who owns productive assets, who controls value chains, who captures value added, and who participates in decision-making. Without such structural interrogation, "transformation" risks becoming a euphemism for intensified extraction under the guise of sustainability branding.

Multi-Dimensional Sustainability: Beyond Environmental Compliance

Current sustainability discourse in palm oil predominantly emphasizes environmental dimensions—zero deforestation, protection of High Conservation Value (HCV) and High Carbon Stock (HCS) areas, peatland conservation, and biodiversity safeguards. RSPO Principles & Criteria, ISPO standards, and EUDR requirements all prioritize environmental compliance and traceability. While essential, this narrow framing obscures equally critical social and economic dimensions [20-22].

Palm oil sustainability must encompass three integrated dimensions: ecological, social (village community), and economic structure (people's economic system). This formulation recognizes that environmental sustainability cannot be achieved if social systems are disrupted and livelihoods destroyed, nor if economic structures systematically impoverish producers. Indeed, when sustainability requirements impose costs disproportionately on smallholders without addressing structural disadvantages, "sustainability becomes an additional cost for the weak and a competitive advantage for the strong [23,24].

This expanded sustainability framework resonates with capabilities approaches in development economics, which emphasize not just environmental outcomes but also human freedoms, agency, and the ability to pursue valued lives[25]. It suggests that sustainable palm oil requires not just certified practices but also secure land tenure, fair value distribution, strong farmer organizations, and participatory governance—what is termed "sustainability with justice" [26,27].

Farmer Agency: From Beneficiaries to Transformation Agents

Agency—the capacity to act independently and make free choices—represents a central yet under-theorized concept in the discourse on palm oil transformation. Most interventions position farmers as beneficiaries of extension services, recipients of training, or targets of certification programs. This positioning reflects what Arnstein's participation ladder would classify as low-level engagement: informing, consultation, or at best placation [28,29]. Farmers are consulted but do not control decisions; they participate in programs designed by others; they receive benefits but do not own systems [30].

Genuine agency requires moving farmers up the participation ladder toward delegated power and citizen control—where farmers themselves design interventions, make strategic decisions, control resources, and hold other actors accountable. It has been demonstrated that social capital—trust, reciprocity, networks—enables collective action that amplifies farmer agency, though they note that such capital remains unevenly distributed and often captured by elites [31,32].

Emerging scholarship on farmer-led initiatives, cooperative development, and multi-stakeholder platforms suggests pathways toward enhanced agency. However, as it has been documented, even ostensibly inclusive models often retain corporate control over critical decisions, limiting genuine farmer autonomy. The transition from farmers as objects to subjects requires not just capacity building but power redistribution—a much more challenging political project [33,34,35].

Value Chain Governance and Upgrading Trajectories

Global Value Chain (GVC) theory provides tools for analyzing power asymmetries in palm oil systems. It has been characterized that the palm oil value chain as buyer-driven, with downstream actors (mills, refiners, traders, consumer goods companies) controlling pricing, standards, and access to premium markets. This governance structure concentrates value capture downstream while squeezing margins for upstream producers, particularly smallholders who lack bargaining power [36,37].

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Upgrading—improving positions within or across value chains to increase value capture—represents a potential pathway for smallholder advancement. It has been identified four upgrading trajectories: process upgrading (enhancing production efficiency), product upgrading (producing higher-value products), functional upgrading (acquiring new functions in the chain), and inter-chain upgrading (applying competences to new sectors) [38].

However, smallholders face substantial barriers to all upgrading trajectories. Process upgrading requires capital and knowledge currently inaccessible to most independent farmers. Product upgrading demands quality differentiation that smallholders cannot achieve in isolation. Functional upgrading—moving into processing, branding, or distribution—requires capital intensity, technology, and market access far beyond the capacity of individual farmers. Inter-chain upgrading assumes successful positioning in the primary chain, which remains elusive [39,40,41].

It has been argued that collective action through cooperatives and farmer organizations represents the most viable pathway for smallholder upgrading, enabling economies of scale, collective bargaining, and shared investment in processing capacity. Yet cooperative development faces its own challenges, including weak institutional capacity, trust deficits, and financial sustainability concerns [42,43,44].

The Transformation Framework: An Alternative Vision

The framework of the transformation trajectory envisions transitioning from extractive plantation monocultures toward diversified tropical agriculture systems owned and controlled by cooperatives. Rather than HGU concessions serving as the basis for capital access, cooperative assets would serve as collateral, enabling smallholders to access formal finance. Rather than mono-cropping palm oil for corporate mills, farmers would integrate palm oil with food crops, livestock, and community forests at the village level, diversifying income sources and enhancing resilience [45,46,47,48].

This vision builds on cooperative economic theory, which emphasizes democratic member control, member economic participation, autonomy, and cooperation among cooperatives as foundational principles [49,50]. It challenges the assumption that efficient agricultural production requires large-scale corporate control, proposing instead that organized smallholders can achieve comparable or superior efficiency while ensuring a more equitable distribution of value [43,51,52,53].

However, the transformation framework faces formidable obstacles. Path dependency in Indonesian agrarian institutions favors the continuation of HGU-based systems. Vested interests—corporate estates, financial institutions, political elites—benefit from current structures and resist redistribution. Weak capacity in the cooperative sector limits the immediate feasibility of implementation. Nevertheless, as an aspirational framework, it usefully highlights the inadequacy of incremental reforms and the necessity of systemic alternatives [54,55,56].

Methodology

Research Design and Rationale

This study employs a qualitative literature review methodology to synthesize and critically analyze recent scholarship on Indonesia's palm oil transformation, with particular attention to smallholder farmers' positioning and agency. A qualitative literature review differs from a systematic review in its flexibility, interpretive approach, and capacity to engage with conceptual complexity and contested meanings [57,58]. While systematic reviews prioritize comprehensiveness and replicability through rigid protocols, qualitative reviews enable deeper engagement with theoretical debates, narrative structures, and power dynamics embedded in scholarly and policy discourse.

This methodological choice suits the research objectives for three reasons. First, the study seeks not merely to aggregate findings but to critically interrogate how transformation is conceptualized, whose voices shape dominant narratives, and what assumptions undergird policy frameworks. Such interrogation requires interpretive flexibility beyond the bounds of systematic review protocols. Second, the research engages with diverse types of literature—peer-reviewed journals, policy documents, industry reports, NGO publications, and news analyses—that resist standardized quality assessment rubrics. Third, the field of palm oil transformation studies is characterized by contested knowledge claims, ideological commitments, and political stakes that demand critical analysis rather than neutral synthesis.

Literature Search Strategy

Literature searches targeted five primary source categories: (1) peer-reviewed academic journals, (2) government policy documents and regulations, (3) international organization reports, (4) industry and NGO publications, and (5) analytical media coverage. For academic literature, searches focused on Scopus, Web of Science, ScienceDirect, and Google Scholar databases using keyword combinations including "palm oil transformation," "smallholder farmers," "farmer agency," "RSPO," "ISPO," "EUDR," "cooperative," "Indonesia," and temporal limiters (2020-2025). Policy documents were accessed through government ministry websites (the Ministry of Agriculture, BAPPENAS, and the Ministry of Cooperatives) and legal databases. International reports came from the World Bank, FAO, CIFOR-ICRAF, WRI Indonesia, and certification bodies (RSPO). Industry publications included materials from GAPKI, IPOSS, and PASPI, while NGO sources comprised reports from WWF Indonesia, Solidaridad, Both ENDS, and Forest Watch Indonesia.

Selection prioritized sources published between 2020 and 2025, though seminal earlier works were included where foundational. Geographic focus centered on Indonesia, with

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comparative Southeast Asian materials included where relevant. Thematic relevance criteria emphasized transformation dynamics, smallholder roles, sustainability governance, institutional arrangements, and policy frameworks. A total of 85+ sources were selected for in-depth analysis, representing disciplinary diversity (agricultural economics, political ecology, development studies, policy analysis) and a plurality of perspectives (academic, governmental, industry, civil society).

Analytical Approach

Analysis proceeded through thematic content analysis following established qualitative research protocols [59]. Initial familiarization involved recursive reading of selected texts, noting patterns, contradictions, and silences. Open coding generated initial code lists capturing key concepts, empirical findings, policy recommendations, and analytical frameworks. Codes were iteratively refined through constant comparison, grouping related codes into candidate themes. Six primary themes emerged: (1) transformation narratives and farmer positioning, (2) structural barriers to farmer agency, (3) partnership models and institutional arrangements, (4) certification dynamics and compliance challenges, (5) policy frameworks and governance mechanisms, and (6) alternative visions and pathways. Within each theme, sub-themes captured nuance and variation.

Critical discourse analysis complemented thematic coding, examining how language, metaphors, and narrative structures construct particular understandings of transformation, sustainability, and farmer roles. Particular attention focused on identifying whose perspectives dominate published literature, which voices remain marginalized, and what assumptions frame policy debates. This critical lens proved essential for surfacing power dynamics often obscured in ostensibly neutral technical analyses.

Synthesis involved integrating findings across themes to construct a comprehensive understanding of transformation dynamics, identifying convergences and divergences across sources, explaining contradictions, and building evidence-based arguments regarding pathways toward farmer-centric transformation. Throughout the analysis, reflexivity regarding the researcher's positionality and potential biases remained central, with interpretations presented as evidence-based arguments rather than objective truth claims.

Limitations

Several limitations warrant acknowledgment. First, reliance on published literature introduces publication bias toward positive findings and successful interventions, potentially underrepresenting failures and challenges. Second, dominance of English-language sources may obscure insights from Indonesian-language scholarship and local knowledge. Third, the temporal lag between implementation and publication means the most recent developments (2024-2026) remain underrepresented. Fourth, literature review methodology provides breadth but not the depth of ethnographic field research; claims about farmer experiences and perspectives rest on secondary accounts rather than direct engagement. Fifth, the author's positionality as an academic researcher influences analytical framing and interpretation. These limitations suggest that findings should be understood as a synthesis of current scholarly consensus and policy discourse rather than definitive truth, and that complementary primary research remains valuable for validating and extending insights.

Findings: Transformation Narratives and Farmer Positioning

Dominant Narrative #1: Compliance-Driven Sustainability

The most prominent transformation narrative emphasizes sustainability through certification and compliance with external standards. RSPO certification, initially voluntary and market-driven, has expanded to include approximately 19% of global palm oil production as of 2023. Indonesia's ISPO certification became mandatory in 2025 under Presidential Regulation No. 16/2025, requiring all plantation units—corporate and smallholder—to obtain certification. The EUDR, enforceable since December 30, 2025, imposes strict traceability requirements and deforestation-free sourcing obligations on all palm oil entering EU markets [60,61].

These certification systems emphasize environmental protection (zero deforestation, HCV/HCS conservation, peatland management), social safeguards (labor rights, FPIC, community development), and operational standards (best management practices, health and safety, record-keeping). Proponents argue that certification drives continuous improvement, creates market differentiation enabling premiums for sustainable palm oil, and verifies that products meet ethical standards increasingly demanded by consumers and governments [62,63].

However, critical scholarship reveals substantial implementation challenges and unintended consequences. It has been documented "uneven participation" in certified supply chains, with independent smallholders facing far greater barriers than scheme smallholders or corporate estates. Land legality documentation—required for both ISPO and RSPO—proves particularly challenging for smallholders, many of whom lack formal land titles due to agrarian conflicts, overlapping jurisdictions, and bureaucratic complexity. GPS mapping requirements under EUDR impose technical and financial burdens disproportionate to smallholder capacity. Audit fees, annual surveillance costs, and group certification coordination expenses further strain limited resources [64-67].

The risk is systematic exclusion. As it has been demonstrated through behavioral economics analysis, certification's complexity

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and cost structure create "behavioral barriers" that deter smallholder participation even when potential benefits exist. If EUDR enforcement proceeds without substantial facilitation support, millions of independent smallholders could be excluded from EU markets, creating parallel supply chains: certified, premium markets for large estates and well-supported scheme smallholders, versus non-certified, discount markets for independent producers. Rather than leveling playing fields, certification could intensify inequality [68-71].

This compliance-focused sustainability paradigm treats symptoms rather than root causes. It addresses deforestation practices without interrogating land tenure systems that drive frontier expansion. It mandates labor standards without challenging value chain governance that squeezes producer margins. It requires traceability without redistributing value capture from downstream toward upstream. Sustainability becomes an additional cost for the weak and a competitive advantage for the strong —precisely the opposite of the transformation that centers on farmer welfare [72-74].

Dominant Narrative #2: Downstreaming and Value Addition

Indonesia's government has prioritized downstreaming palm oil—processing crude palm oil into refined products, oleochemicals, and bioenergy—as a central economic development strategy. The biodiesel program exemplifies this approach. Beginning with B10 in 2008, Indonesia progressively increased biodiesel blending mandates to B20 (2016), B30 (2020), and targets B40-B50 in the coming years. The B30 program alone absorbs over 10 million tons of CPO annually, providing price stability and reducing diesel import dependency, saving an estimated US$8 billion in foreign exchange [75,76,77,78].

Government data indicate that downstreaming has shifted Indonesia's palm oil export structure from 60:40 crude: processed (2015) to 22:78 (2023), substantially increasing domestic value capture. Four downstream pathways are emphasized: oleofood (cooking oil, margarine, shortening), oleochemicals (surfactants, cosmetics), bioenergy (biodiesel, biogas), and biomass complex (fiber board, biomass pellets). Presidential rhetoric celebrates palm oil as a "gift from God" and a strategic asset for energy security, economic sovereignty, and rural development [79,80,81,82].

However, critical analysis reveals that value-added capture remains concentrated downstream, in the refining, processing, and distribution stages, which large corporations and foreign investors dominate. Smallholder farmers, positioned at the bottom of value chains as fresh fruit bunch (FFB) suppliers, receive the smallest share of final product value. FFB pricing formulas, typically based on CPO reference prices minus processing costs and profit margins, are opaque and non-negotiable for individual farmers lacking market power. When input costs (fertilizers, pesticides, labor) rise but FFB prices remain stagnant or decline due to global market volatility, farmers bear the squeeze while downstream actors maintain margins [37,83-85].

Furthermore, dependence on biodiesel creates its own risks. Overreliance on a single domestic off-taker (Pertamina and subsidiaries through PSO mandates) reduces market diversification. It locks farmers into supplying a relatively low-value product (B30 biodiesel) rather than higher-value food and oleochemical applications. Critics argue this perpetuates Indonesia's role as a bulk-commodity supplier rather than advancing up the value chain toward branded consumer products with higher margins [86-88].

Farmers' exclusion from downstream value creation reflects structural barriers. Processing facilities require capital intensity (mills cost US$20-50 million) that exceeds the capacity of individual or even cooperative farmers without external investment. Technology and know-how for refining and oleochemical production remain concentrated in corporate and multinational entities. Market access for farmer-produced branded products faces hurdles in distribution, marketing, and regulation. Without deliberate policies to enable farmer participation in downstream activities—through cooperative-owned mills, joint ventures, equity shares, or preferential procurement—downstreaming risks intensifying rather than ameliorating inequality [33,89,90].

Dominant Narrative #3: Productivity Intensification

The third major narrative emphasizes "sustainable intensification"—increasing yields on existing plantations without expanding cultivated area. This approach aims to reconcile production growth targets (60 million tons of CPO by 2045 and 100 million tons by 2050) with zero-deforestation commitments. Current average Indonesian yields (3.8 tons CPO/ha/year) lag far behind genetic potential (8-10 tons/ha/year with optimal management). Smallholder yields are particularly low: independent smallholders average 2-3 tons/ha/year compared to 5-6 tons/ha/year for corporate estates [91-95].

WRI Indonesia calculations demonstrate that intensifying 3 million hectares of existing smallholder plantations outside forest areas to 8.4 tons/ha/year could produce 25.6 million tons CPO annually—71% of current national production and 43% of 2045 targets. This would require no new land conversion, thus avoiding deforestation, peatland degradation, and biodiversity loss. Intensification strategies emphasize Best Management Practices (BMPs): high-quality planting materials, optimal fertilization (particularly potassium, which yields the highest productivity returns), integrated pest management, proper pruning and harvesting techniques, and replanting aging palms (>25 years) [1,96-98].

Evidence demonstrates the feasibility and benefits of intensification. Rahutomo et al. find that ISPO- and RSPO-certified smallholders achieve 82% higher land productivity than their

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non-certified counterparts, attributing the gains to BMP adoption facilitated by certification programs. Lumbanraja et al. document positive correlations between farmer welfare and productivity, suggesting virtuous cycles where higher yields enable reinvestment in inputs and practices that further enhance yields. Asian Agri's smallholder support programs report productivity increases of 40-76% among participating farmers [99].

However, intensification narratives often underestimate the structural constraints faced by independent smallholders. Quality seeds and certified planting materials remain expensive and often unavailable through accessible channels. Optimal fertilization requires capital for input purchase; many smallholders cannot afford recommended application rates, particularly when CPO prices decline. Extension services remain inadequate, with government agricultural offices chronically understaffed and unable to provide regular farm-level technical assistance to dispersed independent smallholders. Replanting aged plantations—identified as critical for restoring productivity—requires both capital (Rp 50-70 million/ha total cost despite government subsidies of Rp 30 million/ha) and the ability to forego income for 3-4 years until new palms mature [100].

Most fundamentally, intensification that focuses solely on yields per hectare ignores broader dimensions of livelihood security. Diversified farming systems integrating palm oil with food crops, livestock, and agroforestry may yield lower per-hectare palm yields but higher overall household income, nutritional security, and ecological resilience than palm monocultures. The transformation framework questions whether maximizing palm productivity should be the primary goal or whether sustainable livelihoods require fundamentally different agricultural systems [45,93,101,102].

Farmer Positioning: Objects or Subjects?

Across these three dominant narratives, smallholder farmers are consistently positioned as objects rather than subjects of transformation. In the sustainability compliance narrative, farmers are recipients of training programs, targets of extension services, and subjects required to comply with standards designed by distant multi-stakeholder forums or government technocrats. They must adapt their practices to meet certification requirements, but do not participate meaningfully in defining those requirements or governing certification systems.

In the downstreaming narrative, farmers remain raw-material suppliers—producers of FFB that mills purchase at prices set by opaque formulas. They benefit indirectly when downstreaming increases domestic CPO demand and stabilizes prices, but do not own processing facilities, control value-added activities, or capture the majority of incremental value created through processing and refining.

In the intensification narrative, farmers are productivity targets—their yield gaps must be closed through technology transfer, BMP adoption, and management improvement. They receive knowledge from extension agents and researchers but do not co-produce knowledge through participatory research or control the innovation agenda.

There is a critique that crystallizes this pattern: "Farmers are not positioned as system owners or value-added controllers; they will always stop at technical adaptation, not economic reconstruction. The IPOSS Outlook Sawit Indonesia 2026, despite acknowledging that 40% of plantations are farmer-managed, treats farmers as objects in need of development support rather than subjects capable of leading transformation [2,3]. Partnership obligations (20% plasma land allocation in new concessions) frame farmers as beneficiaries of corporate largesse rather than rights-holders entitled to land and autonomy. Even ostensibly progressive interventions—capacity-building programs, certification facilitation, financial inclusion initiatives—often perpetuate paternalistic logics that position farmers as deficient subjects in need of external salvation rather than as competent actors constrained by structural barriers [103].

This positioning has profound implications. It naturalizes power asymmetries, treating corporate dominance and farmer marginality as given rather than as political-economic arrangements subject to contestation and change. It directs interventions toward changing farmers (their knowledge, practices, and organizations) rather than changing systems (land tenure, value chain governance, and financial infrastructure). It forecloses alternative imaginaries—such as the transformation framework—that center on farmer ownership and control.

Structural Barriers to Farmer-Centric Transformation

The Dualistic Agrarian System: HGU as Exclusion Mechanism

Indonesia's agrarian structure reflects colonial-era dualism, with large-scale HGU concessions coexisting alongside smallholder farming. HGU (Hak Guna Usaha, cultivation rights) grants corporations 25-35 year renewable rights to land areas typically ranging from several thousand to tens of thousands of hectares. Critically, HGU functions not merely as land tenure but as financial infrastructure. Banks accept HGU as collateral for substantial loans, enabling corporations to finance plantation development, processing facilities, and working capital. This transforms land tenure into capital access [104].

Smallholders, by contrast, hold individual or communal land rights that rarely qualify as collateral for banks. Even farmers with land certificates (Sertifikat Hak Milik) face difficulties accessing formal credit because land parcels are too small (averaging 2-3 hectares) to justify the lending transaction costs, land values in

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rural areas are too low to secure meaningful loans, or banks lack familiarity with smallholder agriculture risk profiles. Independent smallholders thus remain "not bankable," excluded from formal financial systems [105].

This creates cumulative disadvantage. Without access to credit, smallholders cannot invest in quality planting materials, optimal fertilization, mechanization, or replanting aged palms—lower productivity perpetuates poverty and limits the capacity to accumulate assets. Meanwhile, HGU-holding corporations access cheap credit, achieve economies of scale, invest in productivity-enhancing technology, and capture market share—widening the productivity and income gap. Putri et al. document how this dualistic system generates persistent inequality and periodic agrarian conflicts as concessions expand and encroach on community-claimed lands [106].

Legal reforms have proven insufficient. Presidential Regulation No. 86/2018 mandated that 20% of HGU areas in new concessions be allocated to smallholder plasma partnerships. However, implementation remains patchy, enforcement is weak, and the fundamental logic remains unchanged: corporations retain primary control over land and production. At the same time, smallholders access limited parcels as dependent plasma farmers tied to nucleus estates. Land redistribution through agrarian reform programs has proceeded slowly, hampered by legal complexity, political resistance from landed elites, and constraints on administrative capacity [107].

The transformation framework proposes a radical alternative: replacing HGU with cooperative land ownership, in which organized farmers collectively hold tenure over productive areas and use cooperative assets as collateral to access credit. While conceptually promising, this faces formidable obstacles, including path dependency favoring existing institutions, opposition from vested interests benefiting from the status quo, and the limited current capacity of Indonesia's cooperative sector to manage such arrangements. Nevertheless, pilot projects testing cooperative land tenure models could provide proof of concept and inform gradual systemic reforms.

Value Chain Asymmetry and Market Power Imbalances

Palm oil value chains exhibit marked concentration of buyer power. Mills purchase FFB from farmers, refineries purchase CPO from mills, traders aggregate and export CPO and refined products, and consumer goods companies incorporate palm oil derivatives into final products. Each downstream node exhibits greater concentration than upstream: thousands of smallholders sell to dozens of mills, which sell to a handful of major refineries and traders (Wilmar, Sime Darby, IOI, Cargill), which supply multinational consumer goods companies (Unilever, Procter & Gamble, Nestlé) [36].

This concentration creates oligopsony power—a few buyers facing many sellers. Mills can dictate FFB purchasing terms because farmers have limited alternative buyers, particularly in remote production areas where only one or two mills operate within economically viable transport distance. FFB pricing formulas remain opaque, vary across regions and companies, and offer little transparency into how reference CPO prices translate into FFB prices. Payment delays, quality deductions, and arbitrary grading further disadvantage farmers lacking market information or bargaining leverage [108].

Attempts at collective marketing through farmer groups and cooperatives show promise but face challenges. Successful collective marketing requires sufficient scale to aggregate volumes attractive to buyers, organizational capacity to coordinate collection and transport, and negotiating skill to secure better terms. Many farmer cooperatives lack these capabilities, struggling with low member commitment (free-rider problems in which farmers sell individually when prices rise), weak business management, and inadequate infrastructure (collection centers and transport). Without sustained capacity-building and infrastructure investment, cooperatives cannot achieve parity with corporate actors in market power [44].

Vertical integration—farmer ownership of processing facilities—represents the most ambitious upgrading trajectory but faces barriers to capital intensity and technical complexity. Small-scale mills processing 20-30 tons of FFB per hour cost approximately US$5-8 million, which is beyond most cooperatives' financial capacity. Larger mills (60+ tons/hour) achieving competitive processing efficiency cost US$20-50 million and require access to credit and risk capital that cooperatives rarely possess. Even when financing is secured, successful mill operation demands technical expertise, maintenance capability, effluent management, and market linkages that many cooperatives lack [109].

Alternative approaches include joint ventures in which cooperatives partner with experienced processors, sharing ownership and control while gaining access to technical expertise. Some progressive companies have experimented with such models, though often retaining majority ownership and strategic control. Policy instruments such as preferential credit for cooperative processing facilities, technical assistance programs, and public procurement preferences for cooperative-produced palm oil could accelerate vertical integration, but such policies remain limited in Indonesia [110].

Institutional Weaknesses in Farmer Organizations

Farmer organizations—kelompok tani (farmer groups) and koperasi (cooperatives)—represent critical infrastructure for collective action, yet their institutional capacity remains chronically weak. Asrol et al.'s study of Riau Province cooperatives identifies multiple deficiencies: inadequate governance structures with limited member participation in decision-making, weak financial management with poor record-keeping and

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transparency, limited business services failing to provide value to members beyond minimal input supply, and dependency on external support (government subsidies, NGO programs) without sustainable revenue models [39].

These weaknesses reflect Indonesia's broader challenges in its cooperative sector. Many cooperatives were established through top-down government initiatives rather than organic farmer mobilization, resulting in weak member ownership and commitment. Elite capture remains common, with local elites or company-connected actors dominating cooperative leadership and diverting benefits. Trust deficits rooted in past cooperative failures create reluctance to participate actively or contribute capital. Limited business skills among cooperative managers, often farmers with minimal formal education, constrain strategic planning and professional management [111].

Successful cooperatives demonstrate specific enabling factors. Strong social capital and pre-existing trust within communities provide foundations for cooperation. Visionary, accountable leadership capable of navigating complex regulations and markets is essential. Long-term external support—from NGOs, companies, or government programs—providing capacity building, market linkages, and bridge financing enables cooperatives to reach viability before support withdrawal. Clear value propositions—tangible benefits such as higher FFB prices, reduced input costs, or access to certification—motivate member engagement [112].

Policy implications are clear. Rather than proliferating weak cooperatives, targeted investment in developing model cooperatives with strong fundamentals and clear pathways to sustainability offers greater impact. Long-term capacity-building programs (5+ years) that provide governance training, business development services, financial management support, and infrastructure grants can strengthen institutions. Strongly networked cooperatives, organized into federations or secondary cooperatives, enable economies of scale and knowledge sharing while maintaining local autonomy. However, such approaches require patient capital and sustained commitment from governments, donors, and companies—in contrast to prevailing short-term project logic [10,113,114].

Certification as Barrier Rather Than Bridge

While certification systems aim to improve practices and enable market access, their design often creates barriers for smallholders. Land legality requirements illustrate this dynamic. Both RSPO and ISPO require documented land rights, but many Indonesian farmers lack formal titles due to historical informality, agrarian conflicts, and bureaucratic complexity. Obtaining land certificates (Sertifikat Hak Milik) through Indonesia's land administration agency (BPN) involves lengthy processes, multiple offices, fees, and technical surveys—all of which are beyond the capacity of most smallholders without substantial facilitation support [68].

Even farmers with clear land occupation may face legal ambiguity. Changes to forest area boundaries (kawasan hutan) have retroactively classified some long-established plantations as encroaching on forest zones, creating land-legality challenges that are insurmountable without policy intervention. Indigenous and customary land claims, while recognized in principle by Indonesian law and RSPO standards, require formal documentation and legal recognition processes that are rarely completed [115].

GPS mapping and traceability requirements under EUDR compound challenges. Each farm plot must be precisely mapped with geographical coordinates, requiring technical capacity (GPS equipment, GIS software skills) and time investment. For independent smallholders managing 2-3 hectare plots, the cost-benefit calculus of such documentation is unfavorable without external subsidy. Group certification schemes, in which farmer organizations obtain a single certificate covering all member farms, reduce per-farmer costs but require strong organizational capacity to coordinate data collection, maintain records, and manage group audits [5, 116-118].

Consequently, certification remains heavily skewed toward scheme smallholders with company support. RSPO data shows that by 2022, only 10,675 smallholders (0.4% of Indonesia's 2.3 million palm oil farming families) held RSPO certification, predominantly those in plasma schemes receiving corporate facilitation. Independent smallholder certification rates remain negligible despite comprising the majority of smallholder plantations. ISPO, despite being mandatory, has struggled to reach independent farmers; as of 2024, less than 20% of independent smallholders had obtained ISPO certification [119].

The EUDR deadline of December 30, 2025, for large operators (extended to June 30, 2027, for micro and small enterprises) creates urgency but insufficient time for comprehensive smallholder inclusion without major mobilization. Multi-stakeholder initiatives—such as the Agriterra-Ministry of Cooperatives MoU supporting independent smallholders in Central Kalimantan or WRI Indonesia's Smallholder Hub in Riau—demonstrate facilitation models that work but operate at a limited scale. Scaling such support nationally to reach millions of farmers would require unprecedented coordination and investment from government, companies, and development partners [120,121].

Partnership Models and Pathways Forward

Nucleus-Plasma Schemes: Revolutionary Scale, Structural Limitations

The PIR (Perkebunan Inti Rakyat) nucleus-plasma partnership model represents Indonesia's most significant palm oil transformation intervention. Beginning in the 1970s as part of transmigration programs, PIR linked nucleus estates (inti) operated by state plantations (PTPN) or private companies with surrounding smallholder plasma farmers. Companies developed

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nucleus plantations and processing mills while allocating land to smallholder families (typically 2-hectare plasma plus 0.5-hectare homestead). Companies provided technical support, purchased all plasma FFB, and facilitated bank financing for initial plantation establishment, with farmers repaying through FFB sales deductions [8,122].

PIR's impact on smallholder participation is undeniable. Smallholder plantation area expanded from 6,000 hectares (1980) to 6.8 million hectares (2021), with PIR partnerships facilitating much of this growth. Plasma farmers typically earn 2.5-2.7 times regional minimum wages, substantially above pre-palm oil income levels. Infrastructure development—roads, schools, health facilities—accompanied plantation establishment, improving rural welfare more broadly [123].

However, structural limitations persist. Dependency characterizes the relationship: plasma farmers are contractually bound to sell FFB exclusively to the nucleus mill, eliminating price competition and farmer bargaining power. Production decisions—planting materials, agronomic practices, harvesting schedules—are often prescribed by companies, limiting farmer autonomy. Debt burdens from initial plantation establishment create financial stress, particularly when CPO prices decline. Land allocation delays and conflicts between promised and delivered plasma land undermine trust [14].

Most critically, PIR addresses only a subset of smallholders. Recent plantation expansion (post-2000) has occurred predominantly through independent smallholder development outside formal partnership schemes. These independent farmers—now the majority of smallholders—receive minimal institutional support, lacking access to the technical assistance, credit facilitation, and guaranteed markets that plasma schemes provide. Policy and industry focus on plasma schemes' risks, neglecting independent smallholders who face the greatest challenges yet represent future growth areas [4,124].

Progressive PIR models could address some limitations. More participatory governance, allowing farmer representatives in production decisions; transparent, negotiated FFB pricing formulas; and graduation pathways in which successful plasma farmers transition to independence with retained support would enhance farmer agency. However, fundamentally, PIR perpetuates rather than challenges dualistic structures where corporations control strategic resources (mills, capital, knowledge) while farmers remain dependent producers [14].

Inclusive Closed-Loop Models: Promising Integration

Inclusive closed-loop models, championed by Indonesian business associations and implemented by progressive companies, position farmers at the center of integrated support systems connecting companies, banks, and government. Companies guarantee FFB purchases from participating farmers, often at premium prices, and facilitate bank loans using purchase orders as collateral. Banks and insurance companies provide credit and crop insurance based on guaranteed off-take. Government agencies and companies jointly provide training, certified planting materials, and extension services [125].

Asian Agri's smallholder support programs exemplify this approach. The company's CSF (Community Smallholder Farming) program and its partnership with Apical and Kao Corporation (SMILE Program) provide independent smallholders with comprehensive support packages, including technical training on BMP, quality planting materials, replanting finance, and facilitation of RSPO certification. Participating farmers achieved 40-76% productivity increases and 50-200% income gains depending on initial conditions [99].

Astra Agro Lestari similarly reports significant impacts from its inclusive partnership programs in West Sulawesi, where palm oil development transformed Pasangkayu into a regional economic hub, with farmer incomes rising substantially and local economic activity multiplying. Musim Mas's SustainPalm/BIPOSC program, implemented with SNV Indonesia and partners, integrates regenerative agriculture practices, cooperative strengthening, financial literacy training, and women's economic empowerment initiatives [111].

These models demonstrate that, with sufficient support, improvements in smallholder productivity and welfare are achievable. Long-term engagement (5-10 years), bundled services that address multiple constraints simultaneously, and genuine company commitment beyond CSR tokenism are success factors. Integration of environmental (sustainable practices) and social (gender equality, community development) dimensions with economic support (productivity, income) illustrates multi-dimensional sustainability in practice [125].

However, critical limitations remain. Companies lead these initiatives; farmers benefit, but do not own or control program design. Participation is selective, reaching farmers in company supply sheds but not broader independent smallholder populations. Sustainability depends on continued company commitment; withdrawal of support risks reverting gains. Most fundamentally, while improving farmer welfare within existing structures, closed-loop models do not challenge asymmetric value chain governance or enable farmers to own strategic value-adding assets [35].

Cooperative Development: High Potential, Persistent Challenges

Cooperatives represent the most promising institutional form for farmer-centric transformation, offering potential for democratic governance, collective bargaining power, and asset ownership. Recent initiatives signal growing recognition of this potential. The 2025 MoU between Agriterra (an international cooperative development organization), Indonesia's Ministry of Cooperatives, RSPO, and KSMJ (Koperasi Sekunder Karya Sawit

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Mandiri Jaya, a secondary cooperative in Central Kalimantan) aims to strengthen governance, professionalize business operations, and facilitate sustainable certification for independent smallholders organized in cooperatives [112].

Successful cooperative cases demonstrate viability. KSMJ, operating in Kotawaringin Barat, Central Kalimantan, aggregates multiple primary cooperatives, collectively negotiates with mills for better FFB prices, provides input supply services to members, and is pursuing group RSPO certification. Reported benefits include 10-15% higher FFB prices compared to individual sales, reduced input costs through bulk procurement, and improved farm management through cooperative-facilitated training [112].

However, such successes remain exceptional. Most palm oil cooperatives struggle with fundamental challenges, including weak governance, low member participation, poor financial management, limited business viability, and dependence on external support. Trust deficits stemming from past cooperative failures create reluctance among farmers to commit capital or engage actively. Elite capture, where cooperative leadership enriches itself while excluding ordinary members, perpetuates skepticism [39, 126-128].

International experience suggests that successful cooperative development requires specific conditions. Strong pre-existing social capital and community cohesion provide foundations for trust and collective action. Visionary, accountable leadership capable of navigating markets, regulations, and stakeholder relationships is essential. Phased development with realistic timelines—building social capital and governance before launching business operations—increases the likelihood of success. Long-term technical assistance (10+ years) with gradual withdrawal as capacity develops avoids both dependency and premature abandonment [32,129,130].

Policy can create enabling environments. Simplified cooperative registration and regulatory compliance reduce administrative burdens. Tax incentives for cooperatives with a majority smallholder membership encourage formation and member commitment. Preferential treatment in government procurement, bank lending, and company sourcing creates market advantages that compensate for scale disadvantages. Antitrust enforcement, by preventing monopsony and ensuring fair competition, protects cooperatives from abuse of buyer power [37].

The transformation framework vision takes cooperative development further, proposing cooperatives as primary landholders and aggregate producers rather than mere service organizations. This radical reimagining faces immense obstacles—legal frameworks that privilege HGU, financial institutions unfamiliar with cooperative collateral, and vested interests opposing redistribution—but merits serious consideration as an aspirational framework to guide incremental reforms, even if full implementation remains distant.

Multi-Stakeholder Platforms and Jurisdictional Approaches

Multi-stakeholder platforms bringing together government agencies, companies, NGOs, farmer organizations, and communities represent emerging governance innovations for sustainable palm oil transformation. The Sustainable Palm Oil Dialogue, convened annually by the Indonesian government and RSPO, provides a national platform for policy discussion, knowledge sharing, and coordination around EUDR readiness, ISPO implementation, and smallholder inclusion. Provincial and district-level platforms in major production regions enable localized action that is coordinated among stakeholders [131].

WRI Indonesia's Smallholder Hub in Rokan Hulu and Siak districts, Riau Province, exemplifies practical implementation. The initiative connects independent smallholders to technical training, certification support, and market linkages through partnerships with companies (Unilever, PTPN), local government, and civil society organizations. By 2024, the program had supported over 750 farmers managing 1,564 hectares toward certification, demonstrating proof-of-concept for independent smallholder inclusion [132].

Jurisdictional approaches—operating at the district or provincial scale—enable the integration of environmental protection (deforestation monitoring, HCV conservation), livelihood support (farmer training, cooperative development), and governance improvement (land-use planning, conflict resolution). By engaging all actors within defined territories, jurisdictional approaches address landscape-level challenges that farm or company-level interventions cannot resolve, such as deforestation leakage, infrastructure gaps, and policy coherence [133-135].

Success factors for multi-stakeholder initiatives include government buy-in and facilitation, providing legitimacy and resources, private sector commitment extending beyond compliance to shared value creation, NGO mediation building trust across actors with divergent interests, authentic farmer representation ensuring rural voices shape decisions, and long-term engagement recognizing that transformation requires sustained effort over years or decades [133].

However, multi-stakeholder platforms face inherent tensions. Power asymmetries between corporations and farmer organizations limit genuine negotiation. Competing interests—companies seeking cost minimization, farmers seeking income maximization, and environmentalists prioritizing conservation—create difficult trade-offs. Capture risks exist where powerful actors dominate agendas while marginalizing dissenting voices. Ensuring procedural equity (fair representation) and substantive

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equity (fair outcomes) demands constant vigilance and adaptive governance [113,136].

Discussion: Toward Systemic Transformation

Beyond Technocracy: Recognizing Political Economy

Current transformation approaches predominantly adopt technocratic frames, focusing on identifying best practices, scaling successful pilots, building capacity, and improving efficiency. While valuable, such approaches systematically underestimate political economy dimensions—power relations, vested interests, institutional path dependencies, and distributional conflicts. Transformation that genuinely centers farmers requires not just better techniques but also the redistribution of power, which inherently generates resistance from actors who benefit from current arrangements [106].

Corporate estates, having invested billions in HGU-based plantation systems and processing infrastructure, rationally oppose agrarian reforms that could diminish asset values or force restructuring. Financial institutions with portfolios concentrated in large-scale agribusiness have little incentive to develop alternative lending models for smallholder cooperatives. Political elites with ties to plantation companies and land speculation interests resist policies that empower organized farmers. Downstream actors capturing the majority of value added have no intrinsic motivation to share rents with upstream producers.

Acknowledging these political economy realities does not counsel fatalism but rather strategic realism. Transformation advocacy must build coalitions capable of counterbalancing entrenched interests. This requires organizing farmers into associations with political voice, allying with progressive civil society organizations, identifying reformist actors within government and business, and leveraging international pressure (EUDR, consumer campaigns, investor ESG criteria) to shift incentive structures [26,62].

The EUDR represents such a structural pressure point. By threatening market access for non-compliant palm oil, EUDR creates incentives for companies to invest in smallholder traceability and support systems. However, whether EUDR drives inclusive transformation or mass exclusion depends on implementation choices—such as the degree of flexibility for smallholders, the adequacy of transition support, phasing timelines, and enforcement selectivity. Farmer organizations and civil society must actively engage EUDR implementation debates to ensure outcomes favor inclusion rather than exclusion [67,107,137].

Redefining Sustainability: Integrating Economic Structure

It has been emphasized that sustainability cannot be reduced to environmental compliance. Ecological sustainability without social justice produces "green grabbing"—conservation that dispossesses rural communities. Social sustainability without environmental integrity perpetuates resource depletion, undermining long-term livelihoods. Both ecological and social sustainability, without economic sustainability—ensuring that productive systems generate equitable prosperity—create systems in which farmers bear costs while others capture benefits.

This integrated sustainability concept demands fundamental questions. Is palm oil monoculture truly sustainable, even if it is certified deforestation-free, or does ecological resilience require diversification? Is a system sustainable if farmers remain poor despite "sustainable" certifications? Is transformation genuine if it increases production volumes and corporate profits while perpetuating farmer dependency?

The transformation framework proposes that sustainable palm oil requires a transition from extractive monoculture plantations to diversified tropical agricultural systems that integrate palm oil with food crops, livestock, agroforestry, and community forests. Such systems potentially enhance ecological resilience (biodiversity, soil health), strengthen food security (diversified production), increase income stability (multiple revenue streams), and build social cohesion (community-managed landscapes). They also redistribute control from corporations toward organized farmers and communities.

Empirical evidence for such systems in palm oil contexts remains limited, indicating a need for priority research. Comparative studies of monoculture versus diversified systems measuring ecological, economic, and social outcomes could inform policy debates. Pilot projects implementing the transformation framework models with rigorous monitoring could provide proof of concept. Participatory action research that engages farmers in co-designing and testing alternative systems could combine knowledge production with empowerment.

From Incremental to Transformative Change

Analysis reveals tension between incremental and transformative change pathways. Incremental approaches—strengthening existing cooperatives, scaling best-practice partnerships, expanding certification facilitation, improving extension services—offer pragmatic, achievable gains within current systems. They face less political resistance, require less radical restructuring, and can deliver tangible short-term benefits [99].

However, incremental improvements risk leaving fundamental structures intact. Better-supported farmers within exploitative value chains remain exploited, albeit less severely. More efficient plasma schemes still perpetuate dependency. Certified plantations on land with insecure tenure remain vulnerable to dispossession. Incrementalism may achieve Pareto improvements (some gain, none lose) but cannot address structural inequities requiring redistribution (some gain, others lose).

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Transformative approaches—agrarian reform redistributing land from HGU estates to farmer cooperatives, restructuring value chains to shift value capture upstream, replacing corporate-controlled mills with cooperative-owned processing—directly challenge existing power structures and distributions. They promise more fundamental change but face fierce resistance, require substantial political capital, and involve higher risks of failure or unintended consequences.

Realistic strategy likely combines both approaches sequentially and synergistically. Incremental wins build farmer organizational capacity, demonstrate viability of alternative models, create reform constituencies, and generate political momentum that enables transformative policy shifts. Simultaneously, a transformative vision prevents incrementalism from becoming mere tinkering, providing directional clarity and evaluative criteria for assessing whether incremental steps advance or delay systemic change [10,12,137].

Research and Action Agendas

This literature review identifies critical knowledge gaps warranting future research. First, longitudinal studies tracking farmer trajectories over time under different institutional arrangements (PIR plasma, independent with cooperative support, independent without support) would illuminate causal pathways between interventions and outcomes. Second, political economy analyses mapping actors, interests, alliances, and resistance around palm oil transformation could inform strategic advocacy. Third, comparative studies of successful versus failed cooperatives identifying specific factors differentiating outcomes would provide actionable guidance for cooperative development programs. Fourth, empirical research on the transformation framework models, assessing their viability, challenges, and impacts, would move beyond conceptual advocacy toward evidence-based evaluation. Fifth, participatory action research that engages farmers as co-researchers and co-designers would ensure that research agendas reflect farmer priorities while building research capacity within farmer organizations.

Action agendas must integrate multiple intervention levels. At the farm level, continued technical assistance, BMP training, and support for access to inputs remain essential for improving productivity. At the organizational level, long-term investment in cooperative development—governance training, business services, infrastructure—can build institutional strength enabling collective action. At the value chain level, promoting direct trade, transparent pricing, and cooperative processing can redistribute value and power. At the policy level, advocating for agrarian reform, financial inclusion innovations, certification facilitation, and enabling regulations can create supportive environments. At the global level, engaging EUDR implementation, investor ESG standards, and consumer campaigns can leverage international pressure for domestic change.

Conclusion

Summary of Key Findings

This qualitative literature review examined the transformation dynamics in Indonesia's palm oil industry, with particular attention to smallholder farmers' positioning and agency. Analysis of 85+ sources published between 2020-2026 reveals that dominant transformation narratives—sustainability compliance, downstreaming economics, and productivity intensification—remain fundamentally technocratic, focusing on practice improvement and standard adherence while leaving power structures intact. Within these narratives, smallholder farmers, despite managing 40% of plantations and contributing 34% of production, are consistently positioned as passive objects of development rather than active subjects of transformation.

Structural barriers to farmer-centric transformation are deeply embedded in Indonesia's agrarian political economy. The HGU land concession system functions as an exclusionary mechanism, enabling corporate access to capital while systematically excluding smallholders from formal finance. Value chain governance concentrates market power downstream, creating asymmetric relationships in which farmers face oligopsonistic buyers with limited alternatives. Weak institutional capacity in farmer organizations constrains collective action despite cooperatives' theoretical potential. Certification systems, while aiming to improve sustainability, create compliance barriers that risk excluding rather than including smallholders, particularly with EUDR enforcement beginning in 2025.

Partnership models vary in effectiveness. Nucleus-plasma schemes achieved revolutionary scale, expanding smallholder participation from 2% to 40% of national plantation area, but perpetuate dependency relationships that limit farmer autonomy. Inclusive closed-loop models show promising results in productivity and income gains but remain company-led and do not challenge fundamental power asymmetries. Cooperative development represents the highest potential for genuine farmer agency but faces persistent challenges in governance, management, and financial sustainability. Multi-stakeholder platforms and jurisdictional approaches offer emerging governance innovations but require sustained commitment and equitable power-sharing to achieve transformative impact.

Policy Recommendations

Achieving farmer-centric transformation requires coordinated action across multiple policy domains:

Agrarian Reform: Accelerate land certification for smallholder farmers, establish conflict resolution mechanisms for agricultural disputes, and pilot cooperative land ownership models as alternatives to HGU concessions. Priority should be given to resolving land tenure issues that impede certification and access

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to finance.

Financial Inclusion: Redesign credit systems to accept alternative collateral, including cooperative assets and group guarantees; strengthen BPDP (formerly BPDPKS, Palm Oil Plantation Fund Management Agency) allocations to support independent smallholders; and establish blended-finance facilities that combine grants and loans for smallholder development. These reforms must overcome HGU dependency in the current financial infrastructure.

Institutional Strengthening: Launch a national program to develop 100 model cooperatives over 10 years, with comprehensive support packages including governance training, business development services, infrastructure grants, and market linkages. Simplify cooperative registration procedures and provide tax incentives for smallholder-majority cooperatives. Long-term capacity building (5+ years per cooperative) is essential, in contrast to typical short-term project approaches.

Certification Facilitation: Implement government-led ISPO fast-track programs for smallholders with public agencies providing land legality documentation, extension services, and subsidized audits. Establish urgent EUDR readiness programs with traceability support, farmer registries, and technical assistance to prevent mass exclusion from EU markets. Prioritize group certification schemes to reduce per-farmer costs.

Value Chain Governance: Promote direct trade relationships between farmer cooperatives and downstream buyers; establish transparent FFB pricing mechanisms; support cooperative-owned or cooperative-equity processing facilities; and enforce antitrust regulations to prevent monopsony abuse.

Integrated Coordination: Develop a comprehensive Palm Oil Transformation Roadmap (2025-2030) coordinated across relevant ministries with clear phases, measurable targets, and adaptive management. Establish multi-stakeholder platforms at national, provincial, and district levels, ensuring authentic farmer representation—not tokenism—in decision-making.

From Objects to Subjects: A Paradigm Shift

The fundamental requirement for farmer-centric transformation is a paradigm shift: from viewing farmers as deficient subjects requiring external salvation toward recognizing farmers as competent actors constrained by structural barriers. This shift demands moving beyond "what farmers need" toward "what systems must change." It requires redistributing power, not just building capacity; restructuring value chains, not just improving practices; reforming land tenure, not just titling existing holdings.

The transformation framework, while aspirational and facing formidable implementation obstacles, usefully crystallizes this alternative vision. It challenges assumptions that efficient agricultural production requires corporate scale and control, proposing instead that organized smallholders can achieve comparable efficiency with more equitable distribution. It questions whether maximizing palm oil productivity should be the primary goal, or whether sustainable livelihoods require diversified tropical agriculture that integrates palm oil with food crops, livestock, and agroforestry. It foregrounds farmer ownership and control as non-negotiable rather than as aspirational add-ons to corporate-led development.

Realizing such a transformation requires political courage and sustained commitment from multiple actors. The government must move beyond rhetoric about farmer welfare toward structural reforms that redistribute land, capital, and power. Companies must recognize that genuine sustainability requires sharing rather than capturing value, and that farmer prosperity strengthens rather than threatens supply chain stability. Civil society organizations must continue to advocate, mediate, and monitor to ensure that transformation processes remain inclusive and accountable. International actors must use market pressure (EUDR, consumer campaigns, investor ESG) constructively to support rather than exclude smallholders.

Most critically, farmers themselves must organize, build collective power, amplify their voices, and assert their rights as subjects of transformation rather than accept being positioned as development objects. Transformation cannot be given to farmers; it must be taken by farmers through collective action, strategic alliances, and sustained political engagement. External support can facilitate this process, but farmer agency ultimately determines whether Indonesia's palm oil transformation genuinely serves those who cultivate the land and produce the crop that sustains this multibillion-dollar industry.

Final Reflection

Indonesia stands at a critical juncture. The palm oil industry has achieved remarkable economic growth, lifting millions from poverty and establishing Indonesia as the world's dominant producer. Yet this growth has also generated inequality, environmental degradation, and social conflict. Current transformation efforts, while valuable, remain insufficient because they do not address the root structural causes of inequality and extraction.

The initial question remains urgent: "Transition toward what system and with whose economic logic?" Will Indonesia's palm oil future continue to replicate colonial-era dualism, in which corporations control strategic assets, and farmers remain dependent suppliers? Or can Indonesia pioneer an alternative model in which organized farmers collectively own land, control value-adding processes, participate in governance, and capture fair shares of the wealth they create?

This study argues that the latter path is both necessary for genuine sustainability and achievable with political will and strategic action. It requires moving beyond technocratic

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optimization toward systemic transformation that centers farmer agency. The evidence base, partnership models, and policy instruments exist. What remains needed is commitment to use them not for incremental improvement within exploitative structures but for fundamental reconstruction toward equity, sustainability, and farmer dignity. This is the true meaning of transformation—and it is what Indonesian palm oil farmers deserve.

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